

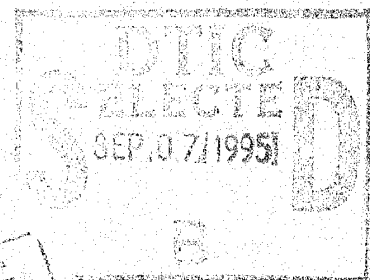
GAO

Report to the Honorable
Harry Reid, U.S. Senate

July 1992

TELECOMMUNICATIONS

Concerns About Competition in the Cellular Telephone Service Industry



EXEMPTION STATEMENT A
Excluded from public release
Exemption: GDS/FOIA

19950905 122



United States
General Accounting Office
Washington, D.C. 20548

Resources, Community, and
Economic Development Division

B-243328

July 1, 1992

The Honorable Harry Reid
United States Senate

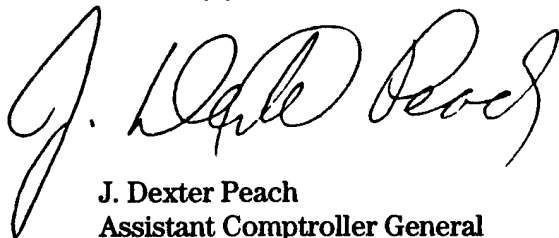
Dear Senator Reid:

In response to your request, this report discusses the current competitive structure of the cellular telephone service industry and prospects for additional competition. The report contains recommendations to the Chairman of the Federal Communications Commission regarding the need for additional evaluation and licensing actions by the Commission.

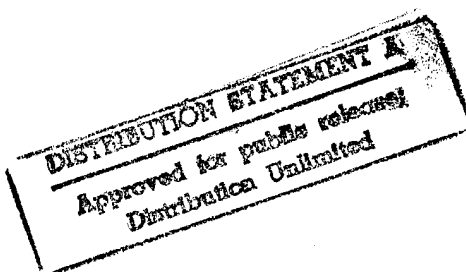
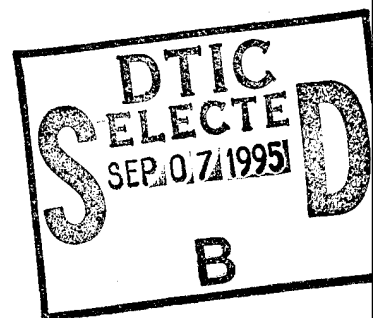
We are sending copies of this report to the Chairman of the Federal Communications Commission. We will also make copies available to others on request.

This work was performed under the direction of Kenneth M. Mead, Director, Resources, Community, and Economic Development Division, who can be reached on (202) 275-1000 if you or your staff have any questions. Major contributors to this report are listed in appendix I.

Sincerely yours,


J. Dexter Peach
Assistant Comptroller General

Accession For	
NTIS GRA&I	<input checked="checked" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By _____	
Distribution/	
Availability Codes	
Dist.	Avail and/or Special
A-1	



DTIC QUALITY INSPECTED 1

Telecommunications:
Concerns About Competition
in the Cellular Telephone
Service Industry

Executive Summary

Purpose

The U.S. cellular telephone service industry has grown from an industry with about 92,000 subscribers in 1984 to about 7.6 million subscribers in 1991, making it one of the fastest growing industries in the country. Revenue growth has also been significant, increasing from \$482 million in 1985 to over \$5.7 billion in 1991. Some industry critics say, however, that the market structure imposed by the Federal Communications Commission (FCC) is not competitive, and that consequently, service prices are high.

Senator Harry Reid requested that GAO review the FCC's oversight of cellular telephone communications. Specifically, he asked that GAO examine the competitive structure of the cellular telephone service industry and determine whether the FCC's current policies are ensuring the availability of cellular telephone services at competitive prices.

Background

The FCC regulates the allocation and use of the electromagnetic spectrum (radio waves) for all non-federal users, including that used by cellular telephones, and licenses cellular telephone carriers to use specific spectrum frequencies. The FCC, in 1981, authorized only two carriers in each geographic (market) area to build facilities and offer cellular telephone service. At that time, the FCC believed that, given the amount of spectrum it had allocated to cellular telephone services, two carriers were the most that the system could support and two carriers would provide some competition. Currently, licensed carriers operate in all 734 urban and rural geographic market areas designated by the FCC.

In addition to selling their cellular telephone services directly to consumers in each market area, the carriers enter into agreements with agents to obtain subscribers, on a commission basis, to their cellular telephone service. Also, the FCC allows an unlimited number of firms, called resellers, to buy cellular telephone service from the carriers at wholesale prices and sell it to consumers.

Results in Brief

While GAO found no evidence of anticompetitive or collusive behavior in the course of its work, the two-carrier (duopoly) market system that the FCC created may provide only limited competition in cellular telephone markets. GAO's analysis of limited data on prices in the cellular telephone industry showed similar pricing by the carriers in most of the major markets; but it did not yield much information about the competitiveness of the industry. Such an analysis would require considerable information,

including revenue and cost data, for carriers' operations in each market. The FCC has not obtained these data, which would be needed to determine whether prices were set at higher than competitive levels. Neither the FCC nor the states have an ongoing evaluation program designed to obtain evidence on the degree of competition in the industry.

Rather than undertaking any evaluation activities, the FCC is relying on the introduction of advanced personal communications services to bring competition to the cellular telephone marketplace. GAO agrees that such services could provide added competition, particularly if those who receive such licenses and are assigned the radio spectrum are not the existing carriers in a particular market. The FCC proposal to reallocate the spectrum for such services, as well as the controversy over proposals to auction the reallocated government spectrum for these uses, could delay the introduction of these services. Such delays would perpetuate the shortcomings of the current cellular telephone service market. In the meantime, cellular telephone carriers would be free to introduce the advanced personal communications services into the markets they currently serve, utilizing their existing spectrum, if they take advantage of the increased capacity made available through the latest transmission technologies.

GAO's Analysis

Current Market Structure May Provide Only Limited Competition

Under current FCC rules, no more than two cellular telephone carriers are allowed in each market area. Generally accepted economic principles imply that a market with only two producers, known as a duopoly market, is unlikely to have a competitively set price that is at or near the cost of production. In addition, restricted entry and the current lack of close substitutes for service provide little chance for further competition.

Because resellers do not own or operate cellular systems, they do not compete with the carriers at the wholesale level. Under the current market structure, the presence in a market of firms that resell cellular telephone service will not generally lead to lower rates for consumers.

GAO found that in about two-thirds of the markets, the best available prices for a given package of cellular telephone service from the two carriers were very close and often nearly identical. In about one-third of the

markets, however, the best available prices for a given package of service differed between the two carriers by more than 10 percent—averaging 22.4 percent. However, even in markets where prices were nearly identical, additional information, such as cost and profit data, would be needed to conclude that noncompetitive practices had occurred. The FCC does not collect such data.

The Competitiveness of Cellular Telephone Markets Is Not Being Evaluated

States have the authority to regulate intrastate cellular telephone service rates, but GAO found no evidence that states have required carriers to routinely submit financial data in order to set prices on the basis of costs. Public utility officials from the six most populous states told GAO that, in their view, cellular telephone service is not an essential service, such as water and electricity, and that the industry is sufficiently competitive not to require traditional public utility regulation.

The FCC also does not undertake any cost-of-service regulation of the cellular telephone service industry. The FCC has said that it does not want to take regulatory action because it has not received evidence showing that cellular telephone companies are engaging in anticompetitive activities or charging excessive prices. The FCC also does not collect revenue, cost, and other data from cellular carrier licensees. Without such data, the FCC has acknowledged that it would be difficult to conclude that the cellular telephone service market is fully competitive.

Emerging Services Have Potential to Enhance Competition

As technology advances and new services providing a function similar to that of the cellular telephone service are brought to the market, more competition may be introduced into the cellular telephone industry. If additional carriers provide these new services, thus offering consumers greater choices of carriers and services, competition could increase in the existing two-carrier cellular telephone markets. The FCC is currently developing the process for licensing carriers for new personal communications services. If the FCC allows existing carriers to obtain additional spectrum for new personal communications services in the same market, the existing market structure may be perpetuated. A policy that favors the allocation of spectrum to new firms, rather than to existing cellular telephone carriers in each market, would seem to serve the public interest by providing additional competition and potentially lower prices for consumers. According to FCC officials, this would not restrict existing carriers from using their current spectrum to also provide the new services.

Scarcity of Spectrum May Present Major Hurdle for New Technologies

A major obstacle to bringing new services to the market is the scarcity of the radio spectrum. Virtually all of the spectrum that is suitable for these services already has been allocated. The FCC has proposed taking the spectrum previously allocated for other purposes and reserving it for new personal communications services. However, incumbent users of the spectrum have asked the FCC to suspend the proposal. These users—railroads, electric cooperatives, and others—cite the potential disruption to safe and reliable rail transportation and electrical power services if their allotted radio spectrum is reduced. Also at issue is the question of whether the FCC should be authorized to use auctions to transfer the spectrum to new providers of personal communications services, rather than using the traditional free allocation. These issues could delay the introduction of new services, thus delaying new competition in the cellular telephone service industry.

Recommendations

GAO recommends that the Chairman, FCC, take the following actions:

- In allocating the spectrum and granting licenses for new personal communications services, the FCC should consider establishing a policy that gives first preference to firms that are not current cellular telephone service providers in a given market area, particularly if only one new license is granted in each market. However, if, in individual cases, the FCC determines that a cellular telephone service provider is the most appropriate licensee for new personal communications services in a market that the provider already serves, the FCC should ensure that other considerations outweigh the benefits of enhanced competition.
- If obstacles, including the difficulty of reallocating the radio spectrum, delay the introduction of new personal communications services beyond the time frames that the FCC currently envisions, the FCC should begin evaluating the status and development of competition in the cellular telephone service industry. As a first step, the FCC could obtain revenue, cost, and other financial data needed to assess the profitability of the cellular telephone service licensees operating in the 30 largest markets. The FCC could use these data in determining whether further actions may be needed to protect consumers' interests.

Agency Comments

GAO discussed the findings in this report with officials in the FCC's Office of Managing Director, Office of Plans and Policy, and Common Carrier Bureau, who generally agreed with the facts presented. However, they disagreed with GAO's recommendation that the FCC assess the

competitiveness of the cellular telephone service industry. The FCC officials believe that such action would detract its resources from focusing on the speedy introduction of the new personal communications services. GAO revised its recommendation to reflect that it would be appropriate to take this action if there are delays in the implementation of the new services. The FCC officials' comments were incorporated where appropriate. However, as requested, GAO did not obtain written agency comments on a draft of this report.

Contents

Executive Summary		2
Chapter 1		10
Introduction	How Cellular Works	11
	Allocation of Radio Spectrum	14
	Development of Cellular	14
	How Cellular Service Is Marketed	16
	Objectives, Scope, and Methodology	17
Chapter 2		19
Current Market	Duopoly Markets May Provide Only Limited Competition	19
Structure May Provide	Analysis of Cellular Pricing	22
Only Limited	Cellular Profitability	26
Competition	Monitoring Competitiveness	28
Chapter 3		32
Emerging Services	New Personal Communications Services Are Being Established	32
Have Potential to	FCC Licensing Policies Could Affect Competition	34
Enhance Competition	Specialized Mobile Radio Systems Will Be Established in Six Major Markets	37
	Source of Spectrum May Present Major Hurdle for Emerging Technology	39
Chapter 4		41
Conclusions and	Conclusions	41
Recommendations	Recommendations	42
Appendix	Appendix I: Major Contributors to This Report	44
Figures	Figure 1.1: Diagram of a Cellular System	12
	Figure 2.1: Average Best Price for 150 Minutes in the Top 30 Cellular Markets	24

Contents

Abbreviations

AMPS	advanced mobile phone service
AT&T	American Telephone and Telegraph Company
CPUC	California Public Utilities Commission
CTIA	Cellular Telecommunications Industry Association
FCC	Federal Communications Commission
GAO	General Accounting Office
GHz	gigahertz
LEC	local exchange telephone carrier
LMR	land mobile radio
MHz	megahertz
MSA	metropolitan statistical area
MTSO	mobile telephone switching office
NTIA	National Telecommunications and Information Administration
PCS	personal communications service
RSA	rural service area
SMR	specialized mobile radio
UHF	ultra high frequency

Introduction

Perhaps no part of the U.S. communications industry has been more affected by advances in technology than the field of land mobile radio (LMR). LMR is a generic term generally applied to a number of public safety, industrial, and land transportation services. Excluding broadcasting, no other nongovernment radio service reaches or affects so many Americans. There are currently three basic types of LMR services: one-way signaling (paging); two-way communications used to control movement of vehicles, such as taxis (dispatch); and cellular telephones, most of which are installed in cars.

Cellular telephone service is one of the fastest-growing segments of the U.S. telecommunications industry. The significant demand for cellular telephones by business and individual users has led to extraordinary growth rates. According to the Cellular Telecommunications Industry Association (CTIA), in December 1984 the industry had 91,600 subscribers; by December 1986, 681,825; by December 1988, about 2.1 million; and by December 1991, about 7.6 million subscribers. Revenue growth has also been significant, increasing from about \$482 million in 1985 to over \$5.7 billion in 1991, according to CTIA.

While subscribers represent a wide range of occupations, they have traditionally been individuals who use cars extensively in their work, such as people in the construction, contracting, and real estate fields. Because of this, cellular systems are used primarily between the hours of 9:00 a.m. and 6:00 p.m. Increasingly, cellular subscribers represent major accounts, such as federal and local government agencies; national and regional shipping, delivery, and transportation companies; and other businesses. Only a small percentage of the cellular subscribers are nonbusiness users.

Cellular telephone growth is expected to continue during the 1990s with the increasing use of hand-held portable telephones, as opposed to car-installed telephones. Portable telephones are not restricted to car use; instead, they enable the users to call or be called at any time they are within a cellular system. Portables are small, self-contained telephones that normally have their own built-in battery and antenna. The newest ones weigh less than 8 ounces, and some can be folded up to fit inside a purse or coat pocket.

Subscribers pay a service charge each month to receive cellular service, and they are charged for the minutes of airtime used. The service charge usually ranges from about \$10 to \$45 per month, depending on the carrier's tariffs and the particular plan of service selected. For a given plan, the

service charge does not vary regardless of how much or how little subscribers use their cellular phone. Airtime charges during peak periods of the day vary from about 25 cents to 45 cents per minute. Most carriers offer a discount on those rates for off-peak usage. When airtime charges and service charges are added, the average monthly bill in 1991 was about \$74, according to CTIA.

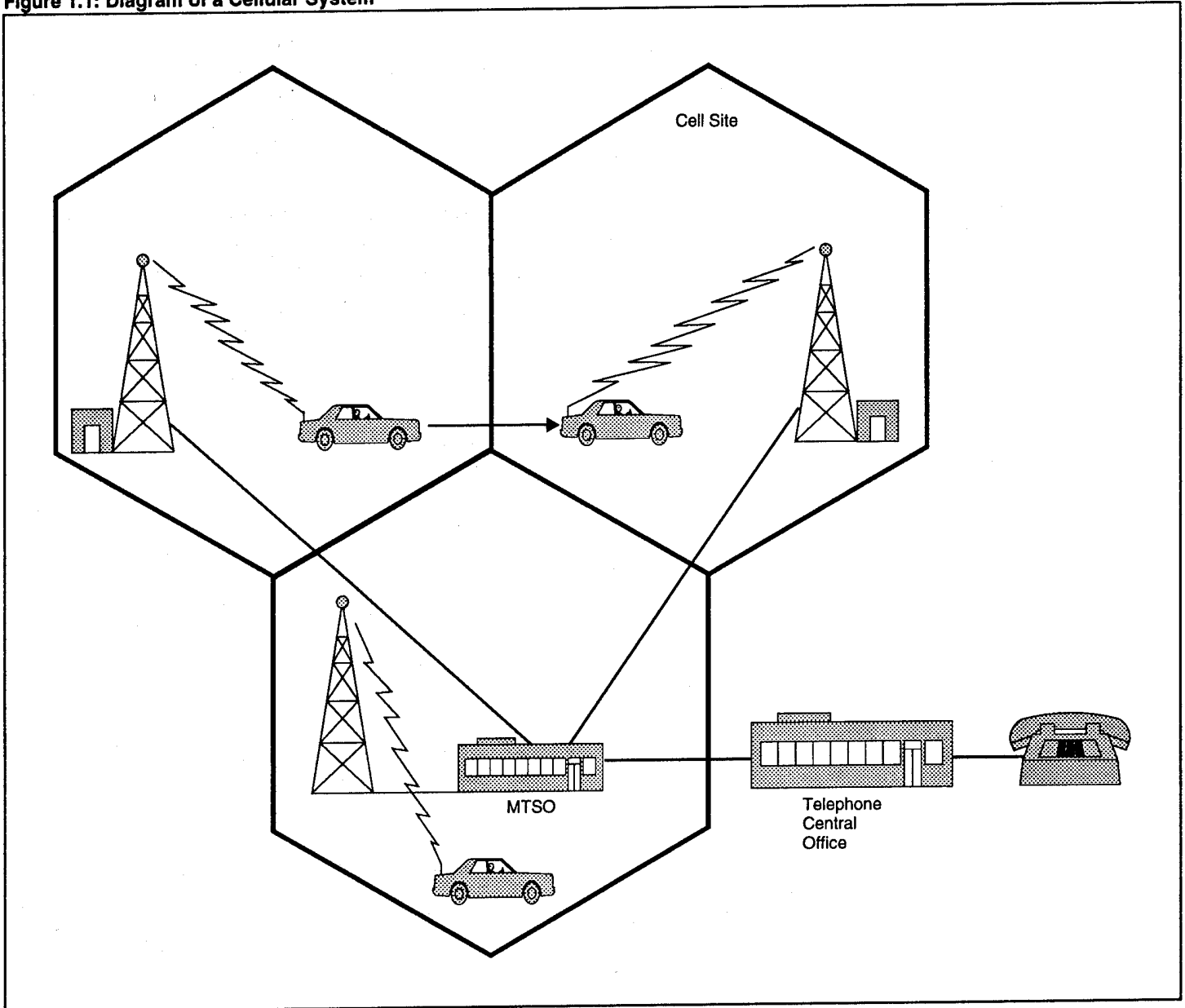
How Cellular Works

A cellular mobile telephone system works by using the airwaves. A very sophisticated two-way radio link is maintained between a person's cellular telephone and the local telephone network that provides regular telephone service to the person's home or office. Cellular uses individual radio frequencies again and again, throughout a city or county, to service a large number of people. Cellular channels are reused simultaneously in nearby areas without callers having to share their conversations.

The process begins with the service provider dividing up a city or county into small areas called cells; hence the name "cellular." Cells can range in size from 1 mile to 20 miles in diameter, depending upon terrain and capacity needs. Each cell is covered by its own low-power transmitter, receiver, and signaling equipment (the "base station"). By controlling the transmitter power and antenna pattern, the cellular operator can shape the range of radio frequencies to that single cell. The base station of each cell is connected by landline, microwave, or other technology to the system's computers in a mobile telephone switching office (MTSO) that controls the operation of the cellular system for the entire service area.

Each conversation in a cellular system involves a radio transmission between a cellular telephone and a base station and the transmission of the call between the base station and the MTSO. When a person walks or drives from one cell to another, a computerized MTSO monitors that user's progress and transfers the user's call from the radio channel in one cell to another radio channel in the next cell—so quickly that the caller may not notice the switch. Figure 1.1 shows a diagram of a cellular system.

Figure 1.1: Diagram of a Cellular System



The radio transmission between the cellular telephone and the base station is currently an analog transmission, and both the cellular telephone and the transmitting equipment are designed to send and receive voice signals exclusively in this mode. Analog transmissions use an information signal directly to vary or modulate one of the characteristics of a carrier wave. New digital transmission technologies are being developed. A digital transmission first samples the information signal at fixed intervals of time and encodes the amplitude of the signal into on/off pulses that can be transmitted directly or by an analog transmission carrier wave. The receiver then decodes the pulses to reconstruct the information signal. Digital technology offers many advantages over the current analog technology, including substantially increased capacity, longer continuous coverage, and voice privacy. Two of the largest providers of cellular service (McCaw Cellular Communications and Southwestern Bell Mobile Systems) have recently announced plans to begin in 1992 to introduce new cellular telephones and transmitting equipment that will be based on digital transmission technology.

Because cellular systems are fully interconnected with the landline telephone network, subscribers can receive and originate both local and long distance calls from their cellular telephones. The cellular carrier pays a fee to the local landline telephone company to carry calls placed from a mobile unit to a wired telephone. The amounts paid are subject to negotiation or tariff and vary from system to system.

All cellular phones are designed for compatibility with cellular systems in all market areas within the United States, Canada, and Mexico and with all channels allocated for cellular use, so that a mobile unit may be used wherever a subscriber is located in North America. Cellular systems in other parts of the world, however, are not compatible. Also, cellular system operators in the United States may provide service to subscribers from another cellular system temporarily located in or traveling through the operator's service area. Such subscribers are called "roamers."

Roaming across national borders may soon be possible. Global cellular telephone networks have been proposed that include a constellation of satellites circling the globe supported by ground stations. These networks would allow a pocket telephone to be used anywhere on earth, even in areas too isolated to have conventional phone service. Implementation of the terrestrial components of the new systems is expected in 2000, while the satellite components are expected to be implemented by 2010.

Allocation of Radio Spectrum

The Federal Communications Commission (FCC), established by the Communications Act of 1934, is an independent federal regulatory agency responsible for regulating interstate and international communications by radio, television, wire, satellite, and cable. The FCC's interstate jurisdiction covers the 50 states and territories, the District of Columbia, and U.S. possessions.

The FCC's responsibilities include administering the allocation and use of the radio spectrum by all nonfederal users. The National Telecommunications and Information Administration (NTIA), under the Department of Commerce, is responsible for allocating the radio spectrum to federal government users. Allocation of radio frequencies involves setting aside segments of the radio spectrum to provide for different uses of the airwaves. Users include AM and FM radio, television broadcasting, shortwave radio, weather satellites, and cellular phones. The spectrum is a valuable resource that must be managed carefully to meet growing demands in the United States.

Development of Cellular

The concept of cellular radiotelephony was developed by American Telephone and Telegraph's (AT&T) Bell Laboratories in 1947. The first tests were conducted to explore commercial applications in 1962. The FCC set aside new radio frequencies for "land mobile communications" in 1970. Toward this end, the FCC reallocated 115 megahertz (MHz) of radio spectrum in the 800/900 MHz bands from the federal government and ultra high frequency (UHF) television to a reserve for land mobile service use. Fifty MHz were eventually allocated for cellular service, and 46 MHz were allocated for private radio services. The remaining 19 MHz were divided among six different services.

In 1970, AT&T proposed to build the first high-capacity cellular telephone system. AT&T called the system AMPS, Advanced Mobile Phone Service, and selected Chicago as the first test city. As that work proceeded, the FCC decided in 1977 to authorize construction of two developmental systems—one in Chicago licensed to Illinois Bell, and a second serving Baltimore, Maryland, and Washington, D.C., licensed to a nontelephone company, American Radio Telephone Service, Inc. These cellular systems began commercial operation in late 1983.

The FCC in 1979 began developing a regulatory scheme for the new service. The FCC originally planned to license only one cellular carrier in each market area. By 1980, however, the FCC had determined that the regulatory

and technical environment had changed significantly so that two cellular carriers could split the spectrum that was to be allocated to cellular service in each market. In 1981, the FCC released its final Report and Order, specifying that it would grant only two licenses in each market to build facilities and offer cellular telephone service. One license was initially reserved for applicants that are not affiliated with any landline telephone carrier (the "nonwireline licensee") and the other license was reserved for the local telephone company (wireline licensee).¹ The FCC believed that a two-carrier market would provide some competition.

FCC rules require regional Bell operating companies that become cellular operators to create a separate subsidiary to own and operate cellular systems. Subject to FCC rules, a cellular system may be sold to either a wireline or nonwireline entity, but no entity may control more than one cellular system in any service area. Each licensee in a market has the exclusive grant of a defined frequency band within that market.

Initially, the FCC divided the first 40 MHz of frequency allocated for cellular service into two 20 MHz licenses for each of the nation's 306 metropolitan statistical areas (MSA) and 428 rural service areas (RSA), known as market areas. The FCC made a second allocation of 10 MHz of frequency available for cellular services in 1986 and divided it equally between the existing license holders.

The FCC began accepting applications for cellular licenses in mid-1982. At this time applications were accepted for blocks of 30 markets, with decisions made first for the largest markets. Licensing decisions were based initially on a process of formal comparative hearings in which the merits of each aspirant were weighed. The comparative hearing process soon became very time-consuming, delaying the introduction of cellular service. Because of the increasingly large number of cellular applications and the delays associated with the comparative hearing process, the FCC announced in 1984 that for markets beyond the top 30, the comparative hearing process would be replaced by a lottery system.

Because applications for markets 31 through 90 already had been filed in anticipation of the comparative hearing process, there were relatively few applications per market. Therefore, the announcement of the lottery system stimulated pre-lottery settlements, or voluntary partnership formation, among competing applicants in markets 31 to 90, and no

¹In the Matter of an Inquiry Into the Use of the Bands 825-845 MHz and 870-890 MHz for Cellular Communications Systems; and Amendment of Parts 2 and 22 of the Commission's Rules Relative to Cellular Communication Systems, Report and Order, CC Dkt. No. 79-318, 86 FCC 2d 469, (1981).

lotteries were ever held for these markets. However, in markets 91 and beyond, applications had not been accepted at the time the lottery decision was adopted. The lottery decision apparently stimulated a dramatic increase in the number of applications.

Today, all 306 MSAs have cellular service and at least one cellular system is operating in each of the 428 RSA markets. Over three-quarters of the 428 RSAs are served by two cellular carriers. The FCC has issued construction permits for most of the remaining RSAs. FCC rules specify a new cellular system must be activated within 18 months after a permit is granted; therefore, the entire nation will soon have access to two cellular carriers in each of the 734 markets.

How Cellular Service Is Marketed

Facilities-based carriers, the two carriers licensed by the FCC in each designated market, build cellular systems and provide the service at the wholesale level. The carriers market the service to consumers in several ways: through their own sales forces, through agents, and through resellers.

Agents are independent businesses and contractors that solicit customers on a commission basis for the carriers' cellular systems. The agents are either in the business of selling or servicing cellular telephones or are engaged in businesses with customers who are likely to become cellular subscribers. In order to attract subscribers, the agents often sell cellular telephones at discounted prices if the buyer agrees to sign a term agreement for cellular service with a particular carrier.² Once the agreement is made, the subscriber deals directly with the cellular carrier, not the agent, on billings, services, and customer support.

Resellers can enter any cellular market in any region of the country and buy blocks of cellular telephone numbers at bulk rates from the two licensed cellular carriers in that market. In turn, the resellers sell services of one or both carriers to their own customers at retail rates and establish themselves as the customer's cellular telephone company—providing a single source for billing, services, and customer support. Resellers require

²Some people have alleged that the combined sale of the telephone with a service contract is a form of product bundling that should be considered illegal under FCC rules. However, others have stated that such product packaging should not be considered illegal and that it is beneficial to consumers. The FCC has recently ruled on this issue. On May 14, 1992, the FCC clarified and modified its rule governing the packaging of cellular telephones and service. The FCC pointed out that allowing packaging of cellular telephones and service benefits consumers by offering them an expanded choice of goods and services at reduced prices, provided that cellular service is also offered separately on a nondiscriminatory basis.

less capital than do primary carriers. Resellers do not build, operate, or maintain cellular systems.

Each carrier designs its cellular system differently to create competitive advantages. By offering the services of both carriers, resellers represent that they help their customers select the best cellular service for their personal communications. Also, resellers say they can switch the customer to the other carrier, without charging an additional activation fee, if the customer becomes dissatisfied with his or her cellular service.

Objectives, Scope, and Methodology

Senator Harry Reid requested us to review the FCC's oversight of cellular communications. Specifically, he asked us to examine the competitive structure of the cellular telephone service industry and to determine whether the FCC's current policies are ensuring the availability of cellular services at competitive prices.

To meet these objectives, we reviewed the economic literature pertaining to the competitiveness of two-carrier market structures and talked with economists who have studied the cellular industry. In addition, we examined prices between the years 1985 and 1991 for services between wireline and nonwireline carriers in the 30 largest MSAs to determine what pricing trends were and whether prices are the same or similar in given markets. We purchased these pricing data from a consulting firm that was the only known source compiling such data. We did not independently verify the accuracy of the data with cellular carriers. Also, we did not have access to information that would allow us to assess carrier profits, but we examined others' financial analyses.

We obtained the views of responsible FCC officials and state public utility commission officials from the six most populous states (California, Florida, Illinois, New York, Pennsylvania, and Texas) on regulating and ensuring competition in the cellular marketplace. We also examined material provided to us by these officials, including a comprehensive review of the cellular regulatory framework in California.

In addition, we reviewed FCC activities under way that may affect the cellular industry. We particularly concentrated on those activities that have the potential to foster competition in the LMR market. We spoke with responsible FCC officials and examined selected comments from interested parties contained in dockets for FCC Notices of Proposed Rule Making and Orders on cellular issues. The issues included proposed changes to FCC's

cellular resale policies; introduction of new technologies, such as personal communications services, which could provide competition to the current cellular system; preferential treatment in the FCC licensing processes to parties requesting spectrum allocation rule changes associated with the development of new communications services and techniques; establishment of wide-area digital specialized mobile radio systems in six frequency-congested markets; allocating spectrum for emerging telecommunications technologies; and bundling of cellular telephones and cellular service.

We conducted our review between September 1990 and May 1992 in accordance with generally accepted government auditing standards.

Current Market Structure May Provide Only Limited Competition

While we found no evidence of anticompetitive or collusive behavior in the course of our work, the two-carrier (duopoly) market system that the FCC created may provide only limited competition in cellular markets. In addition, several characteristics of the cellular marketplace, such as limited entry and lack of substitutes, reduce the chance for additional competition in these markets.

Because resellers do not own or operate cellular systems, they do not compete with the carriers at the wholesale level. Under the current market structure, resellers' presence in a market will not generally lead to lower rates to consumers.

Average nominal prices for cellular service were roughly constant between 1985 and 1991, implying a decline in the real (inflation-adjusted) average price of about 27 percent.¹ The two carriers in a market often, but not always, offer services at very similar prices. These price patterns, however, do not necessarily indicate a lack of competition.

There is some evidence suggesting that the cellular industry should be profitable in the long run, although many carriers are currently experiencing negative cash flows. Because carriers may also earn profits from their ownership of a scarce resource—a portion of the radio spectrum—an evaluation of cellular profitability alone may not enable analysts to determine if the industry has inadequate competition. Neither the FCC nor the states have undertaken a thorough and ongoing evaluation of competition in the industry and, as a result, the data necessary to analyze the degree of competition are not available.

Duopoly Markets May Provide Only Limited Competition

A variety of characteristics of a market and its producers determine its "structure"—and hence the degree of competition. One important factor is the number of firms that produce and sell the good. A market with only two producers—a duopoly market—is unlikely to have a competitively set price that is at or near the cost of producing the good.

In a market with many competitors, the producers would be at an advantage if they could set and maintain a price above the competitive level, as a monopolist might. However, coordinating this effort among many producers is generally impossible—especially since direct agreements among firms are illegal under U.S. antitrust laws. When there

¹Nominal prices at different points in time reflect the purchasing power of a dollar in each different year. Real prices, on the other hand, adjust for changes in purchasing power due to inflation so that prices are comparable in different years.

are only a few producers in a market, however, it is more likely that producers can recognize their interdependence and therefore may be more able to maintain prices above the competitive level. In fact, there are a variety of theories about price-setting in markets with only a few firms, and most of these theories suggest that such markets are not likely to have competitive prices.

There are several characteristics of the current cellular marketplace that may reduce the likelihood that duopoly carriers will behave competitively.

First, generally accepted economic principles imply that the fewer the number of producers in a market the less likely that they will set competitive prices. Since a duopoly has only two producers, it is more likely that these producers can find a way to act noncompetitively than would be the case if there were, for example, five or six producers. Even the FCC recently stated that "it is difficult to conclude that the cellular service market is fully competitive."

Second, while one carrier may have a somewhat larger service area or somewhat better quality of service, there are few significant quality differences among carriers. Economic theory indicates that similarity in product quality facilitates anticompetitive behavior.

Third, the FCC prevents new firms from entering. It can be difficult for firms to maintain noncompetitive pricing practices when new firms can enter the market and provide alternative service. Thus, many economists agree that anticompetitive behavior may be more likely to occur in industries with barriers to new entry than in open-entry industries.

Fourth, the original licensees in many cellular markets have often sold their licenses to other firms. Often, wireline carriers from other locations have purchased nonwireline licenses. A few nonwireline carriers have also obtained many licenses throughout the country. Furthermore, in some partnerships in the cellular industry, the license in a particular city may be partly owned by two different carriers. As a result, a given carrier may find that its competitor in one market is also its competitor in several other markets, and that same competitor may even be its partner in still another market. Some economists believe this pattern of ownership facilitates anticompetitive behavior among firms in some other industries.

Finally, customers currently lack good substitutes for cellular service. Although cellular industry officials and the FCC have stated that carriers

must compete with landline telephone, pagers, two-way mobile dispatch service, and resellers of cellular service, many other analysts have suggested that these services are generally not very close substitutes for cellular service. For example, in its June 19, 1991, comments to the FCC on bundling of cellular equipment and service, the Department of Justice stated that there was insufficient evidence that these products are considered highly substitutable to cellular by consumers. Economic theory suggests that if there is a lack of good substitutes for a product or service, firms would be more likely to be able to maintain prices above the competitive level. If the consumer wants the particular product or service and there are few good substitutes, price becomes less important in the buying decision.

Although many characteristics of the cellular industry may imply a greater likelihood of noncompetitive behavior, it appears that cellular carriers do compete with one another in certain ways. Carriers appear to compete to sign customers onto their systems. For example, one analyst stated that large commission payments and discounted phones represent forms of price competition that carriers engage in as they attempt to attract customers to their systems.

In an attempt to add some competition to the cellular industry, when setting up cellular markets in the early 1980s, the FCC required cellular wholesalers to sell to resellers on a nondiscriminatory basis.² Although the FCC recognized resellers' potential to enhance competition at the retail level, it was uncertain whether a market structure that included resellers would lead to a greater diversity of service or lower prices.

The resellers' costs are, for the most part, controlled by the carrier from which the service is purchased. They do not compete directly with carriers at the wholesale level and their presence does not alter the industry's duopoly market structure. Hence, their presence in a market cannot deter the exercise of market power by licensed carriers or lead to lower prices to consumers.³ For example, the Federal Trade Commission recently stated, "It is unlikely that cellular resellers will provide effective competition at the wholesale level to the two facilities-based cellular

²In the Matter of an Inquiry Into the Use of the Bands 825-845 MHz and 870-890 MHz for Cellular Communications Systems; and Amendment of Parts 2 and 22 of the Commission's Rules Relative to Cellular Communication Systems, Report and Order, CC Dkt. No. 79-318, 86 FCC 2nd 469 (1981).

³In a cellular pricing analysis entered into the California Public Utilities Commission proceeding, Jerry A. Hausman (a professor of economics at the Massachusetts Institute of Technology) found that in 20 of the top 30 cellular markets included in his analysis, the number of resellers operating in a market had no statistically significant effect on the retail price of cellular service.

carriers."⁴ Moreover, even the FCC recently noted that resellers do not appear to provide significant competition to cellular carriers.

Future developments in the cellular industry may reduce the likelihood that carriers will be able to maintain prices above competitive levels if they are currently able to do so. As demand for cellular service shifts from primarily business purposes to both business and residential purposes, consumers may become more responsive to price changes. Pricing above competitive levels may no longer be profitable if such prices cause consumers to drop their service.

Analysis of Cellular Pricing

The average nominal price for cellular service held about steady from 1985 to 1991. During that same period, the real, or inflation-adjusted, average price fell by approximately 27 percent. In addition, there is considerable uniformity in the price offered by the wireline and the nonwireline carriers in a given market. However, neither nominal price stability nor price uniformity in a market necessarily indicates that these markets are noncompetitive.

Critics have charged that certain pricing trends in cellular rates indicate that duopoly cellular firms do not behave competitively. In particular, critics have noted that prices offered by wireline and nonwireline firms within a given market tend to be similar and often identical. Also, they maintain that stable rates for cellular service since the mid-1980s is evidence of the noncompetitiveness of the cellular industry.

To examine trends in cellular pricing, we analyzed information on all pricing plans available on the wireline and the nonwireline carriers in the top 30 cellular markets for each January from 1985 through 1991.⁵ According to the 1990 Census, these 30 cellular markets have a total population of about 113 million. This represents about 45 percent of the total population of the United States.

⁴In the Matter of Bundling of Cellular Customer Premises Equipment and Cellular Service, CC Dkt. No. 91-34, Comment of the Staff of the Bureau of Economics of the Federal Trade Commission, July 31, 1991.

⁵These 30 markets were the most populous metropolitan statistical areas, according to Census Bureau data in the late 1970s, when FCC was first setting up the licensing policies and procedures for the cellular industry. By the 1990 census, there were some changes in the markets ranked as the top 30. For the purposes of cellular markets, we use the earlier definition, which includes: New York; Los Angeles; Chicago; Philadelphia; Detroit; Boston; San Francisco; Washington, D.C.; Dallas; Houston; St. Louis; Miami; Pittsburgh; Baltimore; Minneapolis; Cleveland; Atlanta; San Diego; Denver; Seattle; Milwaukee; Tampa; Cincinnati; Kansas City, Missouri; Buffalo; Phoenix; San Jose; Indianapolis; New Orleans; and Portland, Oregon.

Typically, a carrier will offer a few retail plans that differ with respect to the monthly fee, airtime usage charges, and the number of free minutes. Consumers with a particular usage pattern are usually better off buying a certain type of plan. Therefore, we analyzed carrier rates by using specific "bundles" of cellular service and determining which plan offered the best, i.e., lowest, rate from each carrier for the purchase of that bundle of service.

Comparing a "basic" plan across two carriers can be deceiving because many carriers offer so many different plans. The basic plan may not be the "best" plan for many different packages of service. Therefore, a complete comparison of carrier pricing requires the use of all relevant retail plans.

Trends in Cellular Prices, 1985 to 1991

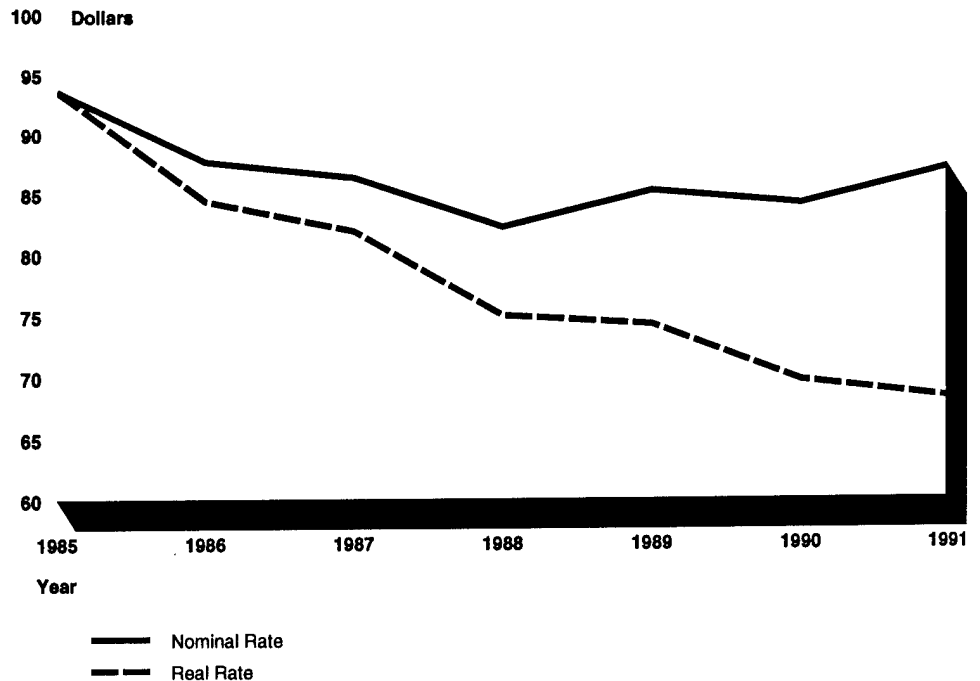
We determined the best price from each carrier for the purchase of 150 minutes of airtime by a single consumer in which 80 percent of the calls were made during peak hours and the average length of a call was 2.5 minutes. We averaged the best rate available across all carriers in the 30 markets that were online in each year.⁶ This yielded the average "best" price of buying the 150-minute package across the 30 markets.

The average nominal and real price for the purchase of the 150-minute package in the top 30 markets in each January from 1985 through 1991 are shown in figure 2.1. While nominal rates fell only slightly during this period, real prices were not stable but instead fell by approximately 27 percent.⁷

⁶In the earlier years, not all systems were online.

⁷For our analysis we used a 150-minute package of service representing a typical user. One analyst told us, however, that he found that nominal rates had fallen for low- and high-use consumers during the last few years. This would suggest that some consumers have experienced a more than 27-percent drop in real price.

Figure 2.1: Average Best Price for 150 Minutes in the Top 30 Cellular Markets



These price trends must be interpreted with caution in terms of their implications for the competitiveness of the cellular marketplace.⁸ It may be true that carriers behaving in a noncompetitive manner may have an incentive to hold nominal prices stable. However, it is not at all clear that the underlying cost structure for the production of cellular service would indicate that prices should have fallen during this time period. In particular, several analysts have suggested that, beyond the initial start-up phase, strong economies of scale do not occur in the production of cellular service because adding customers to the fixed amount of spectrum allocated to each cellular carrier creates congestion and requires expensive cell-splitting to increase effective capacity—particularly in downtown sectors of large cities.⁹ Additionally, many cellular systems are still relatively new and expanding service. As a result, carriers are still incurring large fixed costs. Moreover, large capital costs will continue to

⁸Furthermore, pricing data are only one piece of information needed to determine whether carriers engage in noncompetitive behavior. Cost data are needed to determine firms' profits, and, as discussed in the next section, still more analysis would be required to determine the degree to which cellular firms' profits were caused by the duopoly market structure.

⁹Economies of scale occur when per unit costs decline as a firm increases all of its inputs to expand production.

be incurred in the future as carriers convert from analog to digital technology. Thus, unlike other telephone services (as well as many other products), increased demand may not have resulted in significantly lower per unit costs for producers of cellular service.

Relationship Between
Wireline and Nonwireline
Rate

To compare rates across the two carriers in each of the top 30 markets during January 1991, we priced 11 different "service packages."¹⁰ These ranged from low-use packages of as little as 60 minutes of airtime per month to high-use packages of as much as 400 minutes of airtime per month. For cases in which exactly 12 hours of the day were defined as peak hours, we assumed that 80 percent of the airtime was during peak hours and that the average length of a call was 2.5 minutes. If a carrier defined more than 12 hours as peak time, we defined more than 80 percent of the airtime as peak hours. For each of the hypothetical service packages, we computed the best price available from each of the carriers. We then compared the best price for each package on the wireline carrier to the best price on the nonwireline carrier in each of the 30 markets.

In approximately two-thirds of the markets, the differential between the best prices available for each service package on the wireline and the nonwireline carriers was less than 10 percent—sometimes even identical. In the remaining markets, the best price available differed by more than 10 percent across the two carriers. For those cases in which the differential exceeded 10 percent, the average difference in price across the two carriers was 22.4 percent. Price differentials greater than 10 percent occurred slightly more often for the low-use or high-use consumers, while price differentials for the more typical range of airtime minutes per month (about 100 to 150) tended to be more uniform. Additionally, markets with fairly uniform prices (price differentials of less than 10 percent) were more likely to have uniform prices across most service packages.

Price uniformity does not necessarily indicate that cellular markets are noncompetitive. In highly competitive industries, prices among firms tend to be very similar as well—especially if the product has few quality differences among firms, as is the case with cellular service. However, more evidence, such as cost and profit data, would be required to determine whether or not cellular markets are competitive.

¹⁰We only used a retail plan that was available for a single-line purchase.

Cellular Profitability

If firms in duopolistic markets succeed in maintaining prices above the competitive level, economic theory suggests that they will achieve a significant level of profitability. Although we do not have data that allow us to determine the level of profitability of cellular firms, some available information suggests that cellular firms are expected to earn significant profits in the future. However, interpreting the source of cellular profitability may be difficult because profits can derive from both a noncompetitive market structure and the firms' access to scarce radio spectrum. Also, because of the significant uncertainty about future changes in the market for mobile communications, current analysis of cellular profitability may be somewhat misleading.

Evidence Suggests Significant Cellular Profits in the Long Run

CTIA provided information to us on the net incomes of publicly traded "pure" cellular firms through the second quarter of 1991.¹¹ Because data are available only on pure cellular firms, the CTIA information only covers eight cellular firms. While these data show that the net income of these firms was still negative in the second quarter of 1991, others have told us that cellular firms should see positive cash flows (one measure of profitability) in the near future. For example, FCC officials told us that cash flows have been negative because of large capital outlays during the start-up phase of cellular systems, but that many cellular firms are starting to show positive cash flows at this time. Moreover, these officials stated that the cellular industry should be very profitable in the long run.

As part of its study of the cellular regulatory framework, the California Public Utilities Commission (CPUC) calculated carrier profitability. Carrier data showed that in the early years of operations, carriers tended to lose money, but that financial performance later improved. For the 14 facility-based carriers in California in 1988, the average return on sales for wholesale operations was 31 percent, while the average return on sales for all operations was 15 percent. The average return on equity was 24.5 percent. The CPUC noted that "there is a strong possibility that earnings of the wholesale operations will further improve and will remain high."¹² The California-based Cellular Resellers' Association's own analysis of financial performance of the cellular carriers in Los Angeles, San Diego, and San

¹¹By "pure" cellular we mean firms that are primarily engaged in the production of cellular service as opposed to firms, such as the regional Bell operating companies, that are holding companies for landline telephone carriers.

¹²California Public Utilities Commission Division of Ratepayer Advocates, Phase II Comments on Regulation of Cellular Radiotelephone Utilities, Aug. 11, 1989.

Francisco/San Jose showed wholesale investment returns of between 25.3 percent to 123.1 percent for 1988.

Stock market analysts also are very optimistic about the future of the cellular industry. Several of their reports noted that the growth of cellular cash flow and earnings should be robust over the next decade and that stock values should appreciate substantially in the long run. One report states that even with the likely entry of firms providing products competitive with cellular, the expected return on investment in plant and equipment could ultimately be as high as 40 percent.

Finally, recent sales of cellular licenses indicate the high expected value of these firms. Several analysts have noted that the prices of licenses sold divided by the total population of the market area have increased considerably since cellular systems first went on-line. More importantly, analysts believe that these prices are considerably more than the actual replacement cost of the firm's assets, which one consulting firm attributes to an expectation that the industry will earn profits in the future.¹³ However, as new products are brought to market that provide a function similar to cellular, cellular firms could find their expected future profitability diminished.

Cellular Firms' Access to Radio Spectrum Can Be a Source of Profitability

Some stock market analysts' reports cite the duopolistic market structure of the cellular industry as a partial source of high expectations for future profits. Similarly, some analysts cite the duopoly structure as one of the reasons that licenses have sold for more than the replacement cost of the firms' assets. However, by granting cellular licenses to private firms, the FCC conferred on these firms access to a scarce and valuable resource—the radio spectrum. Thus, some of the profits that cellular carriers earn are probably attributable to their control of this resource rather than to the exercise of market power.¹⁴

Because cellular firms may earn profits related to both their market power and their access to the radio spectrum, it may be difficult to determine the degree to which profits are due to inadequate competition. The CPUC, for example, pointed out,

¹³“Estimate of the Loss to the United States Caused by the FCC's Delay in Licensing Cellular Telecommunication,” National Economic Research Association, Inc., Nov. 8, 1991.

¹⁴Some analysts believe that it might be preferable for taxpayers—rather than private firms—to reap the return to this scarce public resource. However, under current procedures, the FCC generally allocates the spectrum through either comparative hearings or lotteries—neither of which provides the Commission (and thus taxpayers) with a financial return for the allocated spectrum.

Accounting rates of return for wholesale carriers do not in themselves reveal whether profits are due to a scarcity of available radio spectrum, uncompetitive pricing, or the ordinary returns on investment that may be earned due to the riskiness of the cellular industry.¹⁵

Similarly, in a recent report on spectrum management policy, NTIA used two methods to calculate the value of the spectrum allocated to cellular. It notes, however, that some of the estimated value it found may be due to the duopoly structure in the cellular industry rather than the value of the spectrum itself.

Nonetheless, it is the profits due to inadequate competition, if they exist, that are of concern in evaluating the competitiveness of the industry. A recent CPUC proceeding makes this point:

we recognize that profits may be earned by wholesale carriers due to their FCC-granted right to use scarce radio frequencies or spectrum. It is economically efficient and an appropriate spur to system and service expansion for wholesale carriers to keep those profits. However, it is neither efficient nor appropriate for wholesale carriers to earn additional profits due to a failure to compete.¹⁶

Monitoring Competitiveness

Federal and state agencies charged with implementing economic regulation, such as rate-of-return, in regulated industries often require data on costs and prices in order to assess firm profitability. The agencies can then set prices at cost-based levels. This practice might suggest that determining the reasonableness of cellular prices could be accomplished if these data were collected by the FCC or the states. However, even if these data were obtained, it still might be difficult to ascertain what portion of profits was based on the scarcity of the spectrum and what portion on the ability of the cellular carriers to exercise market power. Nonetheless, determining profitability may be a first step in overseeing the competitiveness of cellular service.

State Monitoring

States have the authority to regulate intrastate cellular service rates, but we could find no evidence that any states have, on an ongoing basis,

¹⁵"Investigation on the Commission's Own Motion into the Regulation of Cellular Radiotelephone Utilities," Before the Public Utilities Commission of the State of California, Decision 90-06-025, June 6, 1990, p. 93.

¹⁶"Investigation on the Commission's Own Motion into the Regulation of Cellular Radiotelephone Utilities," Before the Public Utilities Commission of the State of California, Decision 90-06-025, June 6, 1990, p. 59.

required carriers to submit financial data for the purpose of setting prices on the basis of costs. Public utility officials from the six most populous states (California, Florida, Illinois, New York, Pennsylvania, and Texas) told us that, in their view, cellular is not an essential service, such as water and electricity, and is sufficiently competitive not to require traditional public utility regulation. A recent investigation into the status of the cellular industry in Nevada by the regulatory operations staff of the Public Service Commission of Nevada reached a similar conclusion.

The National Association of Regulatory Utility Commissioners reported that, as of December 31, 1990, only 26 of the states regulated cellular service. These states generally required cellular carriers to obtain a Certificate of Public Convenience and Necessity and file tariffs for wholesale and/or retail levels. Tariff filings provide pricing information to the state and its citizens but cannot be used to detect the level of profits because they do not include a disclosure of cost.

California, the state with the largest cellular service market, is one of the states that regulates cellular service. In the fall of 1988, the CPUC initiated a comprehensive review of the cellular regulatory framework. It found that prices of cellular service in the California markets are generally much higher than cost and are based on the market value of the service rather than on competition. Nonetheless, the CPUC issued an interim opinion on June 6, 1990, that proposed to rely on competitive forces to set prices for cellular service and to promote the most rapid expansion of service and use of new technology that is reasonably possible. In particular, the CPUC proposed requiring carriers to expand their systems as rapidly as possible and price their services low enough to fill their capacity. The CPUC's expectation is that this action will ensure substantial decreases in the price of cellular service.

In making its decision, the CPUC bore in mind the essential fact of the cellular industry—that the FCC created a duopoly wholesale market. According to the CPUC, if it had a choice, it would license additional carriers to assure the public the full benefits of an effectively functioning competitive industry without a need for substantial regulatory intervention. Since it did not have a choice of certifying additional carriers, the CPUC decided to rely on the less than full competition available under the FCC's market structure.

Florida, another state having a large cellular service market, does not regulate the cellular industry. A 1992 report from the Florida Senate

Committee on Commerce expressed concern that little is known about the veracity of complaints about high rates and poor quality of services. As a result of this report, a bill was introduced into the Florida State Senate that provided for the Public Service Commission to study and report on the competitiveness of the cellular industry. The bill died in the Senate Finance and Tax Committee. No companion bill was filed in the House.

Although states apparently do not now view cellular as an essential service, cellular telephones may become more of a necessary service to the general public as the cellular industry continues to grow and new personal communications services (PCS) are introduced. A huge infrastructure of cellular telephones could serve the public interest in maintaining alternate communications media and routes to prevent potentially devastating disruptions in service. For example, the cellular telephones can continue to operate and be available to provide emergency services in the event of a disaster such as an earthquake, storm, or fire, or technical problems that disable the landline telephone network. Recent experience has shown the need for such an alternative source of communication.

Federal Monitoring

The FCC has exclusive authority over the allocation and use of the radio spectrum by all non-federal users and the licensing of associated radio facilities. In accordance with this authority, in 1981 the FCC asserted federal primacy over the areas of technical standards and the competitive structure of the cellular industry. According to the FCC, it has authority to regulate the rates of cellular carriers for their provision of interstate but not intrastate communications services. At the present time, however, the FCC does not undertake any cost-of-service regulation of the cellular industry. The FCC believes that because this industry is still undergoing major development, including conversion to digital technology and development of advanced personal communications services, it would be wiser to monitor prior to taking action that may later prove unnecessary.

According to the FCC, it monitors the regulatory structure of the cellular industry by interacting with interested parties—cellular carriers, manufacturers, resellers, agents, and the public—and by participating in cellular conferences and seminars. The FCC also monitors the cellular industry on an ongoing basis by reviewing complaints filed with the Commission against cellular licensees, responding to petitions for rule making and declaratory rulings, and adopting new rules or modifying current ones through formal rule making proceedings. Finally, the FCC says

that it reviews all applications and transfers of control to ensure that the public interest, convenience, and necessity are served.

The FCC says that it does not want to take regulatory action because no evidence has been presented to show that cellular telephone companies are engaging in noncompetitive activities or charging excessive prices. As a result, the FCC does not collect revenue, cost, and other data from cellular carriers, believing that future developments in cellular and other land mobile communications industries may resolve concerns over the current market structure. However, in 1992 the FCC agreed with the June 19, 1991, Department of Justice comments made on the bundling of cellular equipment and service, that without any evidence (such as price and cost data), it is difficult to conclude that the cellular service market is fully competitive.¹⁷

Although the potential problems in the current cellular market structure may be solved as technology advances and new services are brought to the market, obstacles remain. It is unclear whether the technological developments in the cellular industry will result in sufficiently greater competition. In addition, new services may not be available on a large scale for several years. As we point out in chapter 3, there are concerns about the availability of spectrum to accommodate the emerging new technologies and about whether competition will be enhanced if the FCC permits cellular carriers to obtain new personal communications services licenses in their existing market structure.

¹⁷In the Matter of Bundling of Cellular Customer Premises Equipment and Cellular Service, Report and Order, CC Dkt. No. 91-34, (1992).

Emerging Services Have Potential to Enhance Competition

As technology advances and new services are brought to the market that function like cellular telephone service, more competition may be introduced into the cellular telephone service industry. These new services, if offered by additional carriers, could provide additional competition to the existing two-carrier cellular market.

The FCC is currently developing the process for licensing carriers for new personal communications services (PCS) and has not yet established its policy on the eligibility for a license to provide these new services in a particular market. Added competition has been established in six major markets by the FCC's granting one dispatch company permission to use certain spectrum to provide service very similar to cellular. Another FCC initiative—the "pioneer's preference" program—may also result in more competition by fostering development of new services.

The scarcity of the radio spectrum presents a major obstacle to bringing new services to the market. Virtually all of the spectrum that is suitable for these services has already been allocated. The FCC has proposed taking spectrum previously allocated for other purposes and reserving it for new PCS. However, incumbent users of the spectrum have asked the FCC to suspend the proposal. These users—railroads, electric cooperatives, and others—have expressed strong concern about the potential disruption to safe and reliable rail transportation and electrical power services as a result of the proposal. This controversy could delay the introduction of new services, thus delaying new competition to cellular.

New Personal Communications Services Are Being Established

According to the FCC, PCS encompass a broad range of radio communications services that free individuals from the constraints of the wireline, public switched telephone network and enable them to communicate when they are away from their home or office telephone. Basic forms of PCS include the current cordless telephone, which enables individuals to receive or initiate communications in or near their home or office, and paging services, which notify individuals that someone is attempting to communicate with them. Car (cellular) telephones represent a more advanced form of PCS.

Future forms of PCS share many characteristics with current cellular service, but they also have some technical differences. While there are some advantages for consumers of current cellular service over PCS, future PCS will offer some preferable characteristics as well, and demand for these services is expected to be significant. Because PCS will offer a similar

service to current cellular, its introduction should influence the competitive structure of cellular markets, particularly if PCS licenses are not allocated to current cellular carriers in a given market area.

Technology of Emerging PCS

According to the FCC, the most significant feature of the next generation of PCS services appears to be person-to-person, instead of station-to-station communications. Existing PCS require that users have a different telephone instrument for home, office, and car, each with a separate number. Advances in PCS technology have made lightweight, portable telephones more feasible. Future PCS are expected to permit individuals to use the same device in several different environments. Therefore, a person could be reached at any location by dialing a single telephone number. Moreover, future systems are expected to have both greater capacity, thus reducing impediments to user access to the system (call blocking), and digitalization, thus making them more difficult to intercept and, therefore, more private.

Future PCS are expected to include digital cordless telephone radio networks with extensive service areas built on microcell technology. These personal communications networks would be essentially self-contained, although some interconnection to the wireline, public switched telephone network would be built-in. They will use inexpensive, pocket-sized terminals, intelligent networks, and smart cards that can be read electronically to provide information about the user for billing purposes. They will provide integrated services, including voice, data, and image delivery.

The new PCS will share certain characteristics with cellular telephone service. Like cellular telephone service, new PCS will provide wireless, public voice communications and will employ frequent reuse technology via base stations configured in a grid system throughout a market. The new PCS use of low-power microcells in relatively close proximity, with a radius of 700 yards or less will permit smaller and lighter handsets, greater reuse of the radio frequency, greater spectral efficiency, and greater capacity, and may cost the consumer less. There will also be interconnection between the new PCS and the local telephone company (and other communications networks, including cellular networks) for the added convenience of all telecommunications customers in making and receiving calls.

Expected Demand for PCS

Some analysts predict that the likely price structure for the new PCS—perhaps based on \$75 handsets and 13-cents-per-minute airtime—will make portable telecommunications accessible to vast numbers of Americans who are not currently subscribers to cellular services primarily because of high prices. One research firm has estimated that the quantity demanded for new PCS, if they include low service prices and low terminal prices, is large and immediate: 14 million subscribers among all services in the first 3 to 5 years after implementation, and over 60 million subscribers after 10 years, or 8 times the size of the present cellular market. The cellular share of key PCS markets is expected to decline from about 47 percent in 1995 to about 32 percent by 2002.

Although emerging PCS are projected to take an increasingly larger share of the market, it is also expected that the demand for cellular services (analog and digital) will continue to increase at a high rate. The number of subscribers will increase by about four-fold from 1991 to 1998 (7.5 million to 28.6 million), according to a consulting report by Arthur D. Little, Inc. The eventual digitalization of the cellular industry will accommodate this increased demand. The first generation of digital transmission offers a three-fold gain in capacity. Another digital transmission technology under development promises 10 to 20 times analog capacity.

FCC Licensing Policies Could Affect Competition

The FCC is currently developing regulatory policies concerning the implementation of new PCS. It is also considering a “pioneer’s preference” initiative to encourage competition.

FCC Has Requested Comments on PCS Issues

On June 14, 1990, the FCC began a broad inquiry into the development and implementation of new PCS.¹ As part of this process, the FCC invited comments concerning a wide range of PCS issues, including whether there is a need for any restrictions on eligibility for a PCS license in a particular market. In requesting comments, the FCC stated that to the extent that PCS and future generations of cellular would be similar, it could be argued that cellular licensees should not be permitted to apply for a new PCS license in any market in which they are licensed to provide cellular service. According to the FCC, such a policy would appear to promote competition in the personal communications market and thus serve the public interest.

¹In the Matter of Amendment of the Commission’s Rules to Establish New Personal Communications Services, Notice of Inquiry, RM-7140, RM-7175, Gen. Dkt. No. 90-314, 5 FCC Rcd 3995 (1990).

The FCC also acknowledged, however, that it could be argued that local exchange carriers (LEC), many of which also provide cellular service, should not be barred from applying for new PCS licenses in their service area. For example, the FCC recognized that an argument could be made that, to the extent that the new PCS systems will provide telecommunications systems that complement the current landline system, LECS should be able to participate in new PCSS in order to continue to provide by radio those services that they have historically provided by wire. This licensing issue was addressed in many of the comments received by the FCC from about 150 interested parties, including aspiring PCS firms, cellular operators, telephone companies, trade associations, and state public utility commissions.

Several of the aspiring PCS firms said that competition provided by new carriers in the emerging PCS market is vital because competitive pressures reduce prices, increase efficiency, and foster rapid technological development. To ensure the provision of new carriers, some of these PCS firms argued that the LECS should not be eligible to apply for newly allocated PCS frequencies because these providers will adversely affect competition in the developing PCS market. According to these commenters, LECS have market power and will have every incentive to block development of new PCSS by leveraging their dominant power in their current markets to gain an unfair advantage over potential competitors.²

LEC interests took a different view of the PCS licensing issue. Several of the LECS emphasized that they could rapidly and economically deploy new PCSS and that their entry into new PCS markets will not impede competition but enhance it in most instances and ensure that service is available in rural areas where competition may not develop. To this end, the LECS argued that the FCC should make available spectrum for them to provide new PCSS in their serving areas.

In rebuttal, the aspiring PCS firms argued that the LECS have no expertise in the new PCS arena, and with new digital technology, the LECS can use their existing cellular radio spectrum to provide new PCS services. Indeed, FCC officials told us that cellular providers have flexibility to use their spectrum allocation for other mobile services, including some PCS services. Although there may be some technological obstacles that would need to be overcome for these carriers to use their cellular spectrum for

²For example, in the top 30 cellular markets, all the "wireline" and 16 of the "nonwireline" licenses are held by subsidiaries of the seven regional Bell telephone operating holding companies and GTE Corp.; McCaw Cellular Communications, Inc. (the largest cellular service company in the United States) holds 12 of the remaining 14 "nonwireline" licenses.

alternative uses, FCC officials stated that these obstacles were not insurmountable.

The FCC is evaluating all the comments on its inquiry and during the summer of 1992 plans to consider proposals to authorize new PCSS.

Pioneer's Preference

Another FCC initiative—the “pioneer’s preference” program—may also result in more competition to cellular by adding new providers in a given market; but it could also guarantee licenses to existing cellular providers.

On April 9, 1991, the FCC established rules and procedures that will give preferential treatment in its licensing processes to parties requesting rule changes in the spectrum allocation of new communications services and technologies.³ According to the FCC, these pioneer’s preferences will help ensure that innovators have an opportunity to participate either in new services that they take the lead in developing or in existing services to which they wish to apply new technologies. A pioneer’s preference will foster the development of new services and improve existing services by reducing for innovators the delays and risks associated with the current FCC allocation and licensing processes.

The FCC noted that its present method of assigning licenses may discourage potential pioneers from seeking the authorization of new communications services and technologies. More importantly, the FCC expressed concern that as new telecommunications technologies and services are introduced worldwide, American consumers may not receive the early benefits of these technologies and services because of innovators’ fears that regulatory burdens in the United States are excessive.

The FCC will effectively guarantee the recipient of a pioneer’s preference a license to operate in a new service in one area without being subject to competing applications. However, the innovator would not receive a headstart beyond the time it may take other entities to apply for and receive a license. According to the FCC, this preference procedure should provide adequate incentive to innovators while also ensuring that the FCC’s goals of promoting competition and providing new services to the public are met expeditiously.

³In the Matter of Establishment of Procedures to Provide a Preference to Applicants Proposing an Allocation for New Services, Report and Order, Gen. Dkt. No. 90-217, 6 FCC Rcd 3488 (1991), reconsideration granted in part, 7 FCC Rcd 1808 (1992).

A total of 57 requests for PCS pioneer's preference were accepted by the FCC, of the 96 proposals filed by the May 4, 1992, deadline in the PCS proceedings. The requests were primarily from aspiring PCS firms, but some existing cellular providers also submitted requests. The FCC plans to make tentative selection decisions in July or August of this year.

Specialized Mobile Radio Systems Will Be Established in Six Major Markets

In another recent action, involving specialized mobile radio (SMR) systems, the FCC will allow a dispatch firm to establish a service very similar to cellular in six major congested markets. SMR systems are private, two-way land mobile radio stations authorized in the 800 and 900 MHz bands. SMR base station licensees are authorized a specified number of frequencies, generally on an exclusive basis, and are permitted to provide a wide array of commercial mobile communications services to customers (end users).

On February 13, 1991, the FCC acted on a request by Fleet Call, Inc., to establish wide-area, digital SMR systems in six frequency-congested markets.⁴ Fleet Call proposed to combine its existing 800 MHz SMR systems in the congested markets of Chicago, Dallas, Houston, Los Angeles, New York, and San Francisco. Fleet Call would convert its stand-alone, analog SMR systems in each of these markets into integrated digital transmission systems, which, according to Fleet Call, would provide 15 times more user capacity than was being provided on its existing systems. Fleet Call requested a single, systemwide license for each of the six markets that would authorize construction and operation of multiple, low-power base stations, each one permitted to operate on any of the 800 MHz channels licensed to Fleet Call within that market.

In acting on the request, the FCC said it fully recognized the technical difficulty that Fleet Call faced in reconstructing its existing systems from single, high-power sites to multiple, low-power sites. The public interest, it said, favored a regulatory approach that encouraged such endeavors when they lead to the development and implementation of unique and spectrum-efficient communications systems.

The FCC found that its current rules already afforded Fleet Call most of the latitude required to construct wide-area, digital SMR systems. Noting the technical difficulty of the proposed system, the FCC allowed Fleet Call a construction period of 5 years for any newly licensed stations, instead of the usual 1-year period. The FCC declined to grant Fleet Call blanket

⁴In re Request of FLEET CALL, INC. For Waiver and Other Relief To Permit Creation of Enhanced Specialized Mobile Radio Systems in Six Markets, Memorandum Opinion and Order, File No. LMK-90036, 6 FCC Rcd 1533 (1991).

wide-area operating authority for each of the affected markets. Rather, relying on existing policies, the FCC will require individual licenses for each base station.

As a result of the FCC decision and recent advances in technology, Fleet Call believes it has the opportunity to position itself as the third major provider of mobile telephone services in six of the largest metropolitan areas in the United States, competing directly with the cellular operators and with other wireless communications providers in those markets.

According to Fleet Call, the six advanced digital mobile networks will allow it to offer high-quality, enhanced mobile communications services. Fleet Call expects these services to include not only enhanced two-way radio dispatch and paging but also interconnection with the public switched telephone system that is comparable in quality and features to that provided by cellular telephone operators. Under current Fleet Call plans, the digital mobile networks will provide mobile communications services over wide geographic areas.

Each of Fleet Call's markets includes several cellular market areas, except Dallas, which covers the Dallas-Fort Worth market area only. Fleet Call's six markets cover 31 cellular service market areas with a total population of about 61 million. Fleet Call currently plans to commence its digital mobile network service in Los Angeles in August 1993; in San Francisco, New York, and Chicago in 1994; and in Dallas and Houston in 1995.

Fleet Call expects its mobile telephone services to be competitive with those offered by cellular mobile telephone providers in terms of quality of service, features offered, pricing, and user capacity. While Fleet Call believes that no other SMR operator has adequate spectrum to replicate a cost-effective digital mobile network in these six markets, Fleet Call anticipates that other SMRs will implement digital mobile networks in other markets. Motorola has announced the availability of a digital system on a nationwide basis in 1993 and intends to install digital technology using a single site, high-power configuration on its own SMR channels in at least 50 major markets by 1993.

Fleet Call believes that the subscriber units operated by its digital mobile customers will be technologically compatible with the digital facilities constructed in other markets, allowing customers to initiate calls ("roam") in these other markets. To provide roaming capability among other markets, Fleet Call has joined with four other SMR licensees committed to

implementing digital mobile SMR systems to form the Digital Mobile Network Roaming Consortium. Consortium members serve areas with a population of over 90 million people, ranging from Boston to Richmond (including New York, Philadelphia, and Baltimore/Washington); Atlanta; Denver; Minneapolis; Phoenix; Miami; and Tampa/St. Petersburg; as well as Fleet Call's digital mobile network markets.

Source of Spectrum May Present Major Hurdle for Emerging Technology

A major obstacle to bringing new personal communications services to the market is the scarcity of the radio spectrum. Virtually all of the spectrum that is suitable for these services already has been allocated.

On January 16, 1992, the FCC proposed reallocating 220 MHz of spectrum, between 1.85 and 2.20 gigahertz (GHz), from existing users to emerging telecommunications technologies.⁶ Final public comments on the proposal were due by July 6, 1992. The FCC is evaluating the comments and deciding whether and how to allocate the proposed spectrum. According to the FCC, by allocating spectrum for innovative uses now, the Commission will be able to decide upon frequencies for new applications in an orderly manner, without having to go through a difficult and time-consuming spectrum reallocation process each time a new service is introduced.

In recent years, the FCC proposal noted, technological advances in digital and signal processing systems have created possibilities for the development of a broad range of new radio communications services, particularly mobile applications, that need spectrum to operate. However, the FCC proposal noted, virtually all of the spectrum that is suitable for these services already has been allocated to other services.

The FCC proposal acknowledged that this reallocation will have a significant impact on the fixed microwave service users to whom the band is currently licensed. To minimize the impact on these users, the FCC proposed permitting existing fixed microwave users in these bands to relocate to higher frequency fixed microwave bands or to alternative media with minimum disruption to their operations. The FCC proposal noted that this could best be accomplished through the use of a flexible negotiations approach that would permit the new companies to negotiate with utilities and railroads to buy up their licenses over a 15-year transition period.

⁶In the Matter of Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies, Notice of Proposed Rule Making, ET Dkt. No. 92-9, 7 FCC Rcd 1542 (1992).

However, incumbent users of the frequencies have asked the FCC to suspend the proposal and asked the NTIA to identify unused government frequencies for emerging technologies. Railroads, electric cooperatives, and other users have expressed strong concern about the potential disruption to safe and reliable rail transportation and electrical power services as a result of the proposal. The FCC has convened meetings with these users to further explain its proposals and explore ways to resolve the issues raised. The Chairman of the FCC has stated that delays caused by feuding between special interest groups could lead to a repetition of the 11-year delay that held back the introduction of cellular telephone service.

Another potential delay in the allocation of spectrum for the new PCS is the numerous proposals to auction to the highest bidder, rather than the traditional free allocation of spectrum. Several bills are pending in the Congress that would require the federal government to review its use of the radio spectrum and provide at least 200 MHz of radio spectrum for nonfederal use. Some of the bills also contain proposals that would amend the Communications Act by adding a provision authorizing the use of competitive bidding (auction) for awarding all initial licenses or new construction permits. Concerns over whether the FCC should be authorized to use the competitive bidding process in its management of licensing radio spectrum may further delay the reallocation of spectrum necessary to support the new PCS.

Conclusions and Recommendations

Conclusions

Because the FCC limited the mobile cellular telephone market to two carriers in each geographic area, these markets are highly concentrated and may produce only limited competition. Duopoly markets are unlikely to provide a product at a competitively set price. With few substitutes for current cellular telephone service, it is more likely that cellular telephone service may not be competitively priced. To the degree that cellular carriers have market power at the wholesale level, they control, through that market power, prices for resellers as well as end-use consumers. Therefore, reseller presence in a market is not likely to result in lower retail prices.

Pricing does show considerable uniformity in many cellular markets, although this does not necessarily indicate that these markets are noncompetitive. Moreover, while there is evidence that cellular firms are expected to earn significant profits in the future, neither the FCC nor the states have any systems in place to obtain sufficient information to determine whether cellular systems are charging prices above the competitive level. In the absence of any price and cost data, we agree with the FCC and the Department of Justice that it is difficult to conclude that the cellular service market is fully competitive.

Because the FCC established the cellular market as a duopoly, we believe that the FCC has a duty to continually supervise the operations of the cellular telephone carriers; this includes being alert to possible anticompetitive effects. If the FCC collected revenue, cost, and other data from the 30 largest markets in order to evaluate the competitiveness of the cellular market structure, this effort would involve less than 5 percent of the cellular licensees but would cover about 45 percent of the nation's population.

As technology advances and new services are brought to the market that perform a function similar to the cellular telephone, the competitive structure of the cellular telephone industry may improve. The FCC action allowing a dispatch firm to establish a service very similar to the cellular telephone service should add more competition in six major congested markets. However, it is not now known whether additional carriers or the existing cellular telephone carriers will provide new PCS in most of the markets across the country.

If the FCC has a policy of favoring carriers not currently providing cellular telephone service in a particular market when granting new PCS licenses, the new PCS licensee could act as a competitive alternative to existing

services. By giving consumers an additional choice, the new PCS provider could spur cellular telephone carriers to improve their services and lower their prices. Thus, development of new PCS by independent providers could benefit not only the customers who choose to subscribe to the new PCS but also the customers of cellular telephone carriers. These carriers might be forced to respond competitively to new PCS providers. Cellular telephone carriers would still be able to introduce the advanced personal communications services in the markets they currently serve, using their existing spectrum allocation, if they take advantage of the increased capacity available by using the latest transmission technologies.

Nonetheless, other considerations may also be important, and the FCC is in the best position to determine how to balance these factors with the goal of greater competition. However, if the FCC issues a PCS license to a carrier already providing cellular service in that market, the FCC should be prepared to justify its not choosing a new carrier.

The FCC decision not to formally evaluate the competitiveness of the current cellular market structure because of the development of new PCS appears to be reasonable if the new PCS are implemented as quickly as envisioned by the FCC and if they result in additional providers of service similar to the cellular telephone. However, in addition to the yet-to-be determined licensing scheme, the FCC proposal to reallocate spectrum for such services, as well as the controversy over proposals to auction reallocated government spectrum for these uses, could delay the introduction of these services, thus delaying new competition to cellular.

Recommendations

We recommend that the Chairman, FCC, take the following actions:

- In allocating the spectrum and granting licenses for the new personal communications services, the FCC should consider establishing a policy that gives first preference to firms that are not current cellular telephone service providers in a given market area, particularly if only one new license is granted in each market. However, if in individual cases the FCC determines that a cellular telephone service provider is the most appropriate new PCS licensee in a market that it already serves, the FCC should ensure that other considerations outweigh the benefits of enhanced competition.
- If obstacles, including the difficulty of reallocating the radio spectrum, delay the introduction of new personal communications services beyond the time frames that the FCC currently envisions, the FCC should begin

evaluating the status and development of competition in the cellular service industry. As a first step, the FCC could obtain revenue, cost, and other financial data needed to assess the profitability of the cellular telephone service licensees operating in the 30 largest markets. The FCC could use these data in determining whether further actions may be needed to protect consumers' interests.

Major Contributors to This Report

Resources,
Community, and
Economic
Development Division,
Washington, D.C.

John H. Anderson, Associate Director
Paul J. O'Neill, Assistant Director
James E. Gwinn, Evaluator-in-Charge
John A. Thomson, Jr., Senior Evaluator
Amy D. Abramowitz, Senior Economist